Algebra 2 - Radicals

Stasya

"Loneliness is the poverty of self; solitude is richness of self." — May Sarton

Note: It is expected that you try the examples to the best of your understanding, and complete the problem sets by the test date and ask for help where needed.

1 Solving Radical Equations

Here are the steps for solving radical equations:
1. Isolate the radical (one on each side preferably).
2. Square or cube both sides.
3. Solve for the missing variable.
4. Plug solutions back into original equation to check for extraneous solutions (this only applies to square roots).

Example: Solve for x in $(2x+14)^{\frac{1}{2}} - 3 = x$.

Solution: $x = 1$

2 Graphing Radical Functions

You already likely know how to graph the square root and cube root functions. If not, review since they will be on the problem sets.

Example: Find the inverse of $f(x) = 2\sqrt[3]{x+5} + 6$.

Solution: $f^{-1}(x) = \left(\frac{x-6}{2}\right)^3 - 5$

3 Function Operations

You can do operations with functions.

Example: If $f(x) = 3x - 5$ and $g(x) = 4x + 1$, find $\left(\frac{f}{g}\right)(-3)$.

Solution: $\frac{14}{11}$

Composition of functions means to plug one function into another function to create a new function. The notation for this is $f(g(x))$ or $(f \circ g)(x)$.

Example: Given $f(x) = 2x^2 - 1$ and $g(x) = \sqrt{x-2}$, find $(f \circ g)(x)$.

Solution: 17

The domain of a composite function will either be the domain of the inside function or the composite function, whichever is more restrictive.

4 Polynomial Division

Polynomial long division works the same as normal long division.

Example: Simplify $\frac{x^2+9}{x-3}$.

Solution: $x + 3 + \frac{18}{x-3}$

Synthetic division can only be used if the divisor is in the form $x - k$ or $x + k$ (which is $x - (-k)$).

Example: Divide using synthetic division $\frac{4x^4+x^3-x^2-5x+1}{x-1}$.

Solution: $4x^3 + 5x^2 + 4x - 1$

The remainder theorem is if a polynomial $f(x)$ is divided by $x - k$, the remainder is $r = f(k)$.

Example: Find the remainder when $\frac{3x^5+5x^3+2x-3}{x+1}$ is divided.

Solution: -13